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OCCURRENCE OF THE TASMANIAN MUDFISH, *GALAXIAS CLEAVERI* SCOTT, ON WILSONS PROMONTORY—FIRST RECORD FROM MAINLAND AUSTRALIA

By P. D. Jackson and J. N. Davies

Fisheries and Wildlife Division, Arthur Rylah Institute for Environmental Research, P.O. Box 137, Heidelberg, Victoria 3084

Abstract: The Tasmanian mudfish, *Galaxias cleaveri* Scott, is recorded from Wilsons Promontory, Victoria which is the first report from outside Tasmania. This occurrence is considered in the context of recent land bridges between the mainland and Tasmania.

Scott (1934) described the Tasmanian mudfish, *Galaxias cleaveri*, and later (Scott 1936) created the genus *Saxilaga* for *G. cleaveri* and another species, *S. anguilliformis*. Subsequently he (Scott 1942) described a third species of mudfish, *Galaxias upcheri*. Andrews (1976) considered the two *Saxilaga* species not generically separate from *Galaxias* and judged *S. anguilliformis* and *G. upcheri* to be synonyms of *G. cleaveri*. Recent observations by McDowall and Frankenberg (1981) support these views.

Galaxias cleaveri is one of the most specialised of the galaxiids, having adopted a benthic mode of life in swamps and drains, where it is apparently able to aestivate during periods of drought (Scott 1934). It has been recorded from low-lying coastal areas in north, west and south-western Tasmania (Fig. 1). This paper documents the occurrence of *G. cleaveri* on mainland Australia.

METHODS

Specimens of *G. cleaveri* were obtained during a survey of the fish fauna of Wilsons Promontory between 29 April and 16 December 1980. A number of sampling techniques were employed during the survey but all specimens of *G. cleaveri* were taken by electrofishing.

Fish were anaesthetised with quinaldine before being fixed in 10% neutral formalin. After about two weeks, they were transferred to 70% alcohol. Body measurements, according to Andrews (1976), were taken with vernier calipers, read to the nearest 0.1 mm. The four largest specimens were X-rayed and all vertebrae having unmodified centra at both ends counted.

On 16 December 1980, the ph, conductivity, salinity and dissolved oxygen were measured at one point in the sampling site. Depth, to the nearest 5 cm, was recorded every 5 m along a single transect across the site.

RESULTS

Locality

Specimens of *G. cleaveri* were taken from a single locality on a small, swampy tributary of Freshwater Creek, on the south-eastern side of the Promontory (Fig. 1; Lat. 39°4'S Long. 146°26'E). There was no discernible flow, mean depth was 16 cm and the substrate was mud. Conductivity was 1364Ωmhos at 25°C and pH was 5.3. There was no measurable salinity or dissolved oxygen and a 'metallic' film was present over much of the water surface, possibly due to the presence of metallic sulphides formed under anaerobic conditions (T. Pearce, pers. comm. 1981). This film was not present when the site was first visited on 29 October 1980.

Dense stands of tea-tree, *Melaleuca* sp., were present together with areas of eel grass, *Triglochian* sp. The sampling area was partially cleared to construct a walkway for hikers. Outside the area the tea-trees were only centimetres apart, making electrofishing impossible.

Specimens

Five specimens of *G. cleaveri* were captured on 29 October 1980 and ten on 16 December 1980. Ten were preserved for identification and have been deposited in the National Museum of Victoria (NMVA 2037). Other species captured were the common jollytail, *Galaxias maculatus* (Jenyns) (82 specimens, 44-95 mm total length), and the short-finned eel, *Anguilla australis* Richardson, (2 specimens, 231-235 mm total length).

The standard lengths of preserved specimens of *G. cleaveri* ranged from 37.4 to 75.4 mm with a mean of 52.5 mm. Morphometric and meristic data recorded from the 10 specimens are shown in Table 1. Also shown are the ranges of data recorded by Andrews (1976) from three separate collections, each of 10 fish, from Tasmania.

DISCUSSION

Table 1 shows that, except for the ratios of interorbital width to head length and head length to standard length, the mean body ratios for Wilsons Promontory specimens all fall within the range of data recorded by Andrews (1976). The deviant proportions are only marginally outside that range. Similarly, meristic variations agree closely.

The occurrence of *G. cleaveri* on Wilsons Promontory undoubtedly reflects the recent land connections between Victoria and Tasmania. Lying on the con-

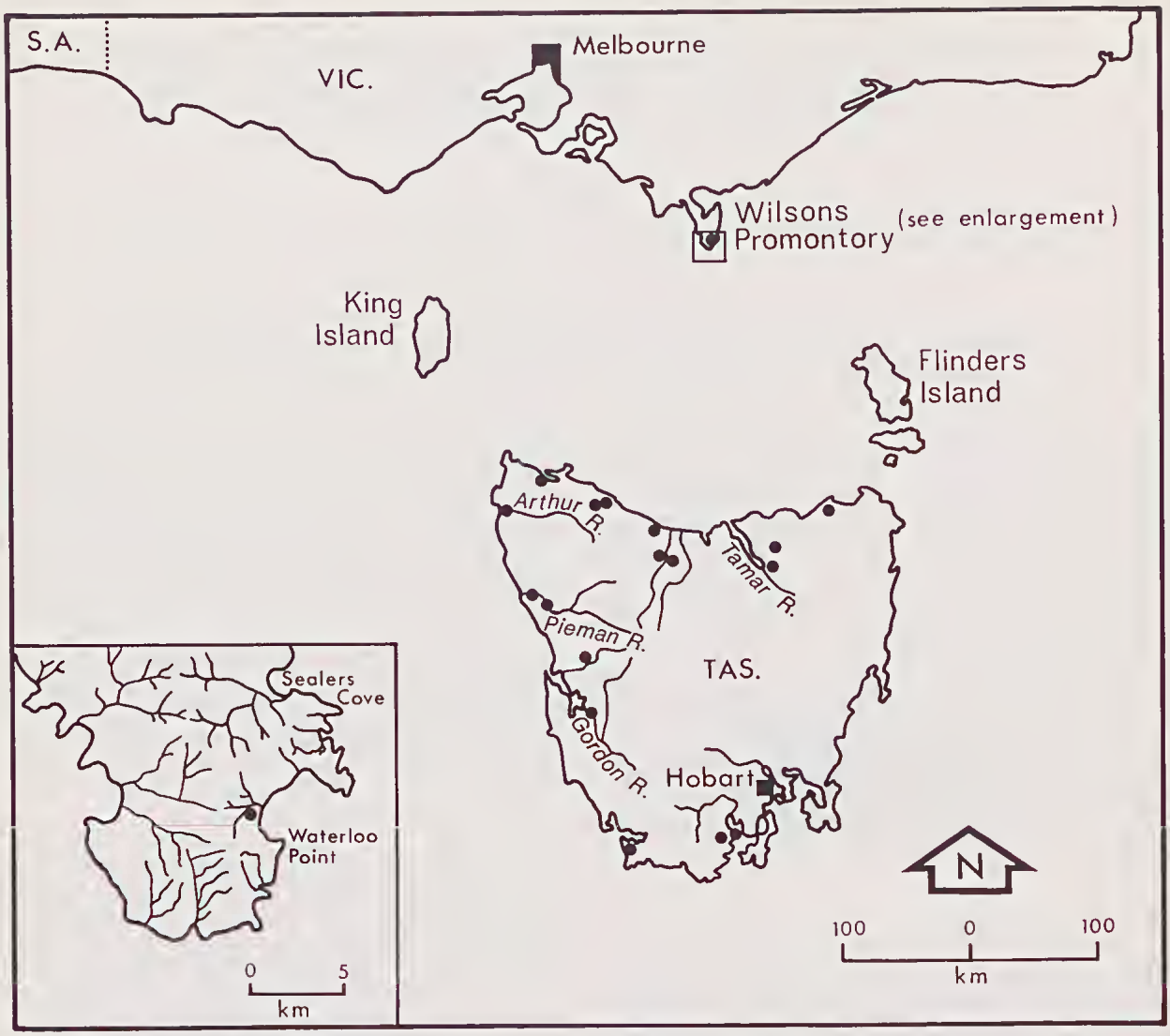

Fig. 1—Current known distribution of *Galaxias cleaveri* with Tasmanian localities taken from McDowall and Frankenberg (1981). Insert shows locality on Wilsons Promontory.

tinental shelf, Tasmania has been part of the Australian land mass throughout its history with the last severing of the land bridge apparently taking plaee about 12 000 to 13 500 years ago (Galloway & Kemp 1981). Opportunities have existed several times in the past for dispersal of fauna via eonfluent streams (Walker 1981) and McDowall (1981) has pointed out that the freshwater fishes of southern Victoria are nearly all represented by eonspeeific populations in Tasmania. Andrews (1976) believed that the present distribution of the Australian Galaxiidae could be explained by the hypothesis that species groups were once widely distributed over southeastern Australia and beeame fragmented by the formation of Bass Strait. He expressed surprise at the apparent absence of *G. cleaveri* from the Australian mainland and from the Bass Strait islands, partieularly sinee the speeies appears to be tolerant of brackish water. The laek of any reeords of *G. cleaveri* from Victoria may, at least in part, be explained by the fact that low-lying coastal swamps have seldom been adequately sampled, often because they are relatively inaccessible. Additional sampling may extend the range of *G. cleaveri* in Victoria.

Galaxias cleaveri has undoubtedly been fragmented in its range in Tasmania by the draining and elearing of swamps (Frankenberg 1974). In New Zealand, a similarly adapted galaxiid, *Neochanna burrowsius* (Phillipps), is seriously threatened with extinction for the same reason (Cadwallader 1975). Indeed, the Nature Conservation Council of New Zealand has dccided to create reserves for the preservation of *N. burrowsius* (Eldon 1979). The oeeurrenee of a population of *G. cleaveri* on Wilsons Promontory may thus be fortuitous as the site is within the bounds of a National Park, where the habitat can be proteeted.

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Table 1
Biometric Data from Ten Specimens of *Galaxias cleaveri* from Wilsons Promontory and Thirty Specimens from Tasmania (Tasmanian Data from Andrews 1976)

A *Morphometric data* Body proportions	Wilsons Promontory		Tasmania	
	Mean	s.d.	Min.	Max
As a percentage of standard length:				
Head length	21.7	1.3	16.7	20.8
Snout tip to dorsal fin origin	71.7	1.0	65.1	77.0
Snout tip to ventral fin origin	53.1	1.8	49.7	54.7
Dorsal length of caudal peduncle	14.0	1.7	12.1	19.3
As percentage of head length:				
Eye diameter	15.2	2.2	10.4	17.7
Upper jaw length	28.1	1.6	20.8	31.4
Lower jaw length	26.5	2.1	22.7	32.0
Gape width	34.6	4.0	30.3	44.6
Interorbital width	43.3	1.2	33.9	43.0
Pectoral fin length/pectoral fin base to ventral origin	39.5	5.1	24.6	42.9
Ventral fin length/ventral fin base to anal origin	43.3	2.4	26.9	46.2
Minimum length of caudal peduncle/dorsal length of caudal peduncle	57.5	9.8	41.8	70.1

B *Meristic data*

	Variation (Number of fish in parenthesis)	
	Wilsons Promontory	Tasmania
Dorsal rays	12(7), 13(3)	11(10), 12(15), 13 (5)
Anal rays	13(7), 14(3)	12 (3), 13(13), 14(12), 15(2)
Pectoral rays	13(6), 14(4)	12 (1), 13(19), 14 (9), 15(1)
Ventral rays	6(4), 7(6)	5 (1), 6 (5), 7(21)
Vertebrae	56(2), 57(2)	56 (2), 57 (4), 58(4), 59(1)

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